

## **REMARKS/ARGUMENTS**

Applicants acknowledge safe receipt of the "Notice of References Cited" (form PTO-892) and the references attached to the Examiner's Office Action dated December 10, 2003.

In response to the Office Action, Applicants request favorable reconsideration of the subject application in view of the following remarks/arguments:

### ***Information Disclosure Statement***

Applicants submit that reference AE listed in the PTO-1449 submitted on September 8, 2003, "Applications of Magnetic Sensors for Low Cost Compass Systems" by M.J. Caruso, appeared in the Position Location and Navigation Symposium, IEEE 2000, pages 177-184, which was held in San Diego, CA, USA on March 13-16, 2000. Thus, March 2000 is the publication date for the reference. A revised PTO-1449 containing the information is enclosed. Accordingly, the Examiner is requested to consider and initial reference AE listed in the revised PTO-1449.

### ***Claim Rejections - 35 USC §102***

Claims 1-2 were rejected as being anticipated by Jacknin et al., U.S. Patent 5,854,843 (the Jacknin reference).

The rejection is respectfully traversed.

The present invention as set forth in claim 1 is directed to a micro electro-mechanical system (MEMS) based micro azimuth-level detector comprising multisensors, A/D converter, microprocessor, RS-232 electrical interface, and a PC

having an Operation-Display software. The multisensor contains 3 accelerometers and 3 magnetometers, and the 3 accelerometers are assembled along 3 orthogonal axes and having a processing circuit, and the 3 magnetometers are assembled along 3 orthogonal axes and having a processing circuit. The Jacknin reference fails to teach or disclose the multisensor of the present invention.

The Jacknin reference fails to teach or disclose the multisensor having 3 accelerometers and 3 magnetometers, with the 3 accelerometers being assembled along 3 orthogonal axes and having a processing circuit, and the 3 magnetometers assembled along 3 orthogonal axes and having a processing circuit, as disclosed in the present invention. In contrast, the Jacknin reference discloses a gyro-based virtual navigator which has 2 functional subsystems, the sensor system and the data acquisition system. See column 2, line 21 and column 3, lines 26-32. The sensor system contains 3 sets of angular sensors, each set including a gyroscopic rate sensor from Systron Donner, an accelerometer from AMP, and an external reference which is either an inclinometer or laser (yaw).

Particularly, the Jacknin reference neither teaches nor discloses the use of a magnetometer in the sensor system as disclosed in the present invention. A gyroscopic rate sensor differs from a magnetometer. The gyroscopic rate sensor senses angular rate, which measures the rotational rate along the axis of the sensor. The system in the Jacknin reference integrates angular rate information to provide angular data along three axes: pitch, roll, and yaw. While in the present invention, magnetometers are used to measure the component of the Earth magnetic field along the axis of the magnetic sensor.

The three orthogonal components of the Earth magnetic field and the three orthogonal components of the gravity acceleration measured by the tri-axis accelerometers are synthetic to get the orientation of the subject using the algorithm described in the present invention. Thus, the gyroscopic rate sensor as taught in the Jacknin reference is not a magnetometer as in the present invention.

Moreover, the information measured by gyro in the Jacknin reference is different physical information from that measured by magnetometers of the subject invention. Thus, the subsequent processing of information and the design of the systems are different.

Furthermore, the Jacknin reference emphasizes the importance of the gyroscopes in the virtual navigator. The use of gyroscopes are described as a new feature of the invention. See column 7, lines 20-25. The Jacknin reference does not concern the magnetometers.

Applicants respectfully submit that the examiner's action at page 3, line 10 is incorrect in labeling 303, 304, 306 as magnetometers. The Jacknin reference clearly states that 303 and 304 are gyros and 306 is an external reference laser, see column 5, line 29 to column 6, line 3, which should not be confused with magnetometers.

In view of the above, the Jacknin reference does not teach the present invention as set forth in claim 1. Thus, claim 1 is not anticipated, or made obvious, by the Jacknin reference. Since claim 2 depends on claim 1, claim 2 is also patentable over the Jacknin reference.

***Allowable Subject Matter***

Claims 4-7 have been allowed. As discussed, *supra*, claim 1 is not anticipated, or made obvious, by the Jacknin reference. Thus, claim 3 which depends on claim 1 is also patentable over the Jacknin reference.

Accordingly, all rejections have been overcome and claims 1-7 are in condition for allowance, early notice is which is requested. Should the subject application not be allowed, the Examiner is requested to contact Applicants' attorney to resolve the issue.

No fee is believed to be due. Should any fee be required, please charge the same to Deposit Account No. 22-0261 and notify Applicants' attorney.

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Respectfully submitted,



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